TUBE LORE

SUPPLEMENT 2

REPLACES SUPPLEMENT DATED 9-19-96

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CORRECTIONS [1]

P. 3. Five more (final?) nuvistors are the RCA 2EG4, RCA 8059 (more info needed), Hitachi 2B-H5, Toshiba 3D-HH13, and Toshiba 6D-HH13.

P. 8, col. 2, 1st para. The "rocket" tube is 2C26.

P. 11, col. 2. Cunningham numbers parallel RCA's, "numbered 100 higher" (C-299 = UX-199; CX-301A = UX-201A; CX-220 = UX-120), with exceptions (C-112 = UX-112).

P. 12, col. 1. Ken-Rad Wunderlich tubes were KR20 and KR22.

P. 14, col. 1. The Magnavox Type A has two small rectangular grids, each surrounding its own filament strand, in a common plate.

P. 15, col. 2. For equivalents of "WLS" tubes, see p. 16.

P. 67, col. 1. The 6327 has a unique pinout, not covered by a standard EIA diagram.

P. 148. The following three types got lost in editing:

1851 Video pentode, top-cap variant of 6AC7 w/ 1/8" pin for grid cap; has same characteristics as 6AC7 except for capacitances, which are actually slightly higher.

1852 [AKA 6AC7, q. v.]; pentode.

1853 [AKA 6AB7, q. v.]; pentode.

P. 174, col. 1, third para. There are indeed a few tube testers that apply test voltages before the "test" button is pushed. An example is one of the Jackson emission types.

P. 175, col. 2, 2nd para. Revitalizing a BH rectifier involves putting a diode in series with each plate lead to guarantee rectifier action. The tube still conducts, thus giving its normal large voltage drop, which is ca. 100 volts.

P. 178. The 6AV5 lacks a top cap, and belongs under the heading "Single-Ended Octal."

P. 186. "HY"-prefixed tubes are listed on p. 123.

SUBMINIATURE TYPES (P. 2)

Numerous subminiature types carry dual numbering, depending on whether they have long leads for soldering-in or short leads for socket use. The following are some such duals. This may be handy in equipment restoration: clip the leads on a 1C8, and a 1E8 results.

Long	Short	Long	Short
1C8	1E8	2E31	2E32
1S6	1T6	2E35	2E36
1V5	1AC5	2E41	2E42
1V6	1V6/S	2G21	2G22
1W5	1AD5	6BF7	6BG7

As time went on, use of sockets for subminiature tubes became rare, and new types were introduced with only long leads - the military-grade types were considered reliable enough to be soldered in, and sockets were a reliability problem in their own right.

It is an indication of what a specialty item subminiature tubes were that about 200 types were registered, yet all are scarce today. There was negligible civilian use of these types: a few dictating machines, hearing aids, and a few portable radios.

DE FOREST TYPES (P. 11)

The De Forest 401-499 are "industry" types, that is, types known elsewhere in the tube industry as (UX)-201 through (2)80, etc. and (UX)-199.

Besides the other power types, there was a DFV464, an RF-heating triode equivalent to the W WL-464 [2].

ROGERS (P. 15)

New information on these Canadian types [3], plus some further research, yields the following.

EARLY TYPES

There were very early rectifiers, R100 and R200. These were basically gridless 201As.

"S" TYPES

Rogers' "S" spray-shielded types after 1934 were usually sprayed all over, including the bakelite base. Grounding was via contact springs that clasped the base.

Like Majestic, Rogers made the 56AS, 57AS, and 58AS, which are electrically similar to the 76, 77, and 78 respectively.

The 87S and 88S are pentodes like the 77 and 78 respectively but drawing 400 mA; same pinouts.

The 89RS is rectifier-duodiode and power-pentode, renumbered 6G7S in 1935; exact registration date not known. The diodes share an independent cathode which is internally wired to the screen of the pentode. It has seven pins plus a grid cap.

The 6H7S triode-pentode (there seems to have been no 6H7M) also has seven pins plus cap, roughly like the octal 6AD7. The 6G7S and 6H7S have odd pinouts with heater on Pins 3 and 4.

"M" TYPES

The octal "Metal Spray" types having grid caps had "small" caps such as are used on big-pin tubes like the 78.

The following types are similar to non-"M" standard versions: 1C7M, 1F7M, 1P5M, 75M/6B6M, 6F5M, 6F6M, 6J5M, 6J7M, 6J8M, 6K6M, 6K7M, 6R7M, 6T6M, 12A8M, 12B8M, 12K7M.

Other "M" types are related to more familiar types as follows:

34M = 1D5
41M = 6K6
75M = 6Q7
77M = 6J7
80M/R80 = 80
85M = 6R7
86M ~ 6C5, 6J5, or 6P5.
87M = 6J7
88M = 6K7 w/ 400-ma heater.
84M is a duodiode with the same pinout <6S> as the 6X5GT.
6A7M = 6A8
6B7M = 6B8 but w/ unique pinout.
6F7M = octal 6F7 w/ pinout differing from the 6P7 "octal 6F7."
6H7M ~ 6AD7 w/ unique pinout and a top cap.
12B6M = 12Q7
20J8M (see p. 33).
2X3 ≈ ½ 5Y3; fil. 2.5 V @ 2.0 A, 350 V in, 125 mA (11-4-37) <4X>. Has pinout of first section of 5Y3GT.
2Y3 - see 2X3.
6X6 - see p. 29. Same pinout <7AL> as 1629.

RECEIVING TYPES (P. 17 ff.)

It is appropriate to emphasize that this book does not attempt to list "all" registered receiving types, as that would bring in an ocean of uninspiring color-TV types. However, receiving types are being added as "interesting" ones appear - particularly obscure types not mentioned in the usual tube manuals. It has also been suggested that information on TV vertical-output triodes having potential audio applications would be helpful. (There was, for example, a *Radio News* article in the '50s on a small hi-fi amp using a 6BX7 as push-pull output stage.)

2A3 ("More Lore.") There are three 2A3s. The single-plate version, beloved of tube-audio enthusiasts, was introduced by RCA in early 1933. The next variant has a complex plate structure, in a ++ shape as viewed from above, with dual "M"-shaped filaments. ("Dual-plate," the usual name, is a misnomer - it's a single structure, and

"dual-filament" would be more accurate.) A postwar version has two independent triodes in parallel. Of 18 2A3s inspected, three were single-plate, 13 were dual-plate, and two had the twin-independent construction. These bore an RCA-style etch and "A8M" date code on the bulb, but were base-stamped "CBS-Hytron" [date] "5243" and "Sylvania" [date] "326" respectively, i. e, 1952-53.

The single-plate 2A3 uses 21 tiny filament wires in parallel, similar to the multi-wire, low-voltage "harp cathode" introduced by Amperex for instant-heating mobile transmitting tubes 30 years later, in types like the 8042, 8300, or 8509. There's nothing new under the sun . . .

2EG4 Nuvistor high-μ triode, heater 1.7 V @ 600 mA, μ 68, g_m 12.5 mS, 1.5 W, for grounded-cathode neutralized RF amps in TV and FM receivers (RCA) <12AQ>.

6AF4, A Min. triode, dual pins for grid and plate, heater 6.3 V @ 225 mA, μ 16, g_m 7.5 mS, 2.25 W <7DK>. "A" has controlled warmup time and shorter bulb. Probably the first mass-market UHF tube - the local oscillator in UHF TV tuners, competing w/ SY 6T4.

6AW5 Full-wave rectifier, metal or spray-shielded, octal base, dual cathodes, heater 6.3 V @ 600 mA, 250 V in, 120 mA total, prewar Italian type (by FIVRE?) <7Q>.

6AY8G Duodiode-power-tetrode, octal w/ cap, heater 6.3 V @ 1.25 A, gm 9.5 mS, 4 W output, prewar Italian type (FIVRE). Similar to Philips EBL1. Detector and reflexed IF/audio stage in "Radio Roma" receiver.

6BL7GT, GTA Medium-μ octal duotriode, heater 6.3 V @ 1.5 A, μ 15, g_m 7.0 mS, 10 W per section, for vertical sweep (12 W total) (RCA, SY, TS) (6-27-50) <8BD>. "A" has longer-life first section; both sections have controlled plate current under zero bias.

6BN8 Duodiode-pentode, metal or spray-shielded octal w/ cap, heater 6.3 V @ 300 mA, gm 1.1 mS. Prewar Italian type; *not* the (SY) 9-pin 6BN8 duodiode-triode as registered 10-24-55.

6BX7GT Medium-μ octal duotriode, for vertical sweep, heater 6.3 V @ 1.5 A, μ 10, g_m 7.6 mS, 10 W per section (12 W total) (GE, RCA) (12-7-51) <8BD>.

6BY8 Duodiode-power-pentode, octal w/ cap, heater 6.3 V @ 1.25 A, gm 11 mS, 4.5 W output. Prewar Italian type; *not* the (SY) 9-pin 6BN8 duodiode-pentode as registered 5-21-56.

6CK4 Low-μ octal triode, for vertical sweep, heater 6.3 V @ 1.25 A, μ 6.6, g_m 5.5 mS, 12.0 W (GE, RCA, SY) (9-9-57) <8JB>. Promoted by SY for audio use; potentially a heater-type replacement for 6B4G.

6DY7 Dual beam power tube, T12 bulb on octal base, said to be a frame-grid type, heater 6.3 V @ 1.2 A, gm 6 mS, 15 W per section (GE, TS) (10-27-58) <8JP>. In Stromberg-Carlson ASP422 stereo amp.

6DZ7 Dual beam power tube, T12 bulb on octal base, heater 6.3 V @ 1.52 A, 400 V, 13.2 W per section (GE, RCA, SY, TS) (6-22-59) <8JP>. Apparently equals two 6BQ5s, uprated on plate voltage. In at least one Heathkit stereo amp.

6EA7 Dissimilar octal duotriode, for vertical sweep, heater 6.3 V @ 1.05 A; first section μ 66, g_m 2.2 mS, 1.0 W; second section μ 5.5, g_m 6.0 mS, 10 W (RCA, SY) (3-30-59) <8BD>. (SY 1968 manual lists incorrectly as min. 9-pin.)

6EM7 Dissimilar octal duotriode, for vertical sweep, heater 6.3 V @ 925 mA; first section μ 68, g_m 1.6 mS, 1.5 W; second section μ 5.4, g_m 7.2 mS, 10 W (RCA, SY) (9-14-59) <8BD>. Barely different from 6EA7; usually labeled "6EA7/6EM7."

6FY5 [AKA EC97]; min. frame-grid RF triode, heater 6.3 V @ 200 mA, μ 70, g_m 13 mS (MU) (5-9-60).

6S4, A Min. 9-pin med.-μ triode, for vertical sweep, heater 6.3 V @ 600 mA, μ 4.5, 8.5 W (GE, RCA, SY) (12-5-49) <9AC>. "A" has controlled warmup time.

6TH8 Triode-hexode, octal base, heater 6.3 V @ 700 mA, sim. to ECH3 (prewar European type).

12AC6 Min. remote-cutoff pentode, heater 12.6 V @ 150 mA, gm 0.73 mS, for 12.6-V B+ (TS) (3-26-56) <7BK>. In 1956 Motorola car radios w/ 12AD6, 12AE6, 12K5, and TS-176 transistor.

12AD6 Min. heptode, heater 12.6 V @ 150 mA, conversion gm 0.3 mS, for 12.6-V B+ (TS) (3-26-56) <7CH>. Also see 12AC6.

12AE6, A Min. duodiode-triode, heater 12.6 V @ 150 mA, μ 17, gm 1.3 mS, for 12.6-V B+ (TS) (3-5-56) <7BT>. Also see 12AC6.

12K5 Min. space-charge tetrode, heater 12.6 V @ 400 mA, for 12.6-V B+. Puts out 40 mW. Space-charge grid draws 75 mA @ 12.6 V (TS) (12-27-55) <7FD>. Also see 12AC6.

14A5 Loktal power pentode, like 12-V 7C5 but lower-powered; *not* a 12-V 7A5. Heater 12.6 V @ 150 mA, 7.5 W (GE) (10-24-40) <6AA>.

19A3 Rectifier, variant of 35W4 w/ nontapped heater, 19.0 V @ 150 mA, in Japanese-made AM-FM receivers ca. 1965; generally replaceable by 35W4.

21TH8 Triode-hexode, 6TH8 w/ heater 21.0 V @ 200 mA (prewar European).

117P7GT Diode rectifier - pentode, 117L7GT w/ simpler pinout (TS) (1-7-41) <8AV>.

800-SERIES TYPES (P. 35)

812-H Top-cap variant of the 812, with graphite anode, hard-glass bulb, and metal-ceramic base; rated at 85 W intermittent at 30 MHz and promoted for use in amateur transmitters (UE).

825 In addition to the two "825"s listed, there was a Sylvania version apparently having the same ratings as Taylor's except for a μ of 8.0 instead of 20.

853 Xmtg. triode, variant of UV-204A with pure-tungsten filament having current raised to 16.25 A [4].

854 Xmtg. triode, variant of UV-207 with pure-tungsten filament drawing 52 A at 14.5 V (instead of 22 V); also rated at 10 kW dissipation but giving lower output than the 207 because of lower filament emission [4].

855 Vacuum rectifier, gridless version of 854, rated at 50 kV PIV and 5 A peak [4].

874 (More info.) Originally filled with neon; later S-bulbed production and ST-bulbed had xenon or argon fill giving deep blue glow instead of orange.

EARLY REGISTERED SPECIALS (P. 41)

1B102 "Thyrode" G-M counter, mica window, cylindrical body, UX base, 700-900 V (VN).

1B106 "Thyrode" G-M counter, mica window, cylindrical body, coaxial base, 700-900 V (VN).

1B124 "Thyrode" gamma counter, cylindrical body ca. 12-½" long, coaxial base, 700-900 V (VN).

1B125 "Thyrode" cosmic-ray counter, cylindrical body 16" long, coaxial base, 900 V (VN).

1B126 "Thyrode" G-M counter, needle probe type, coaxial base, 900 V (VN).

6C23 [AKA X-126H]; xmtg. UHF ring-seal pulse triode, grid-on-ring, fluted anode, heater 7 VCT @ 26 A, μ 14, 600 MHz, forced-air cooled (1-10-47). Related to 8C22.

5500-SERIES SPECIALS (P. 52 ff.)

Some of the highest-numbered types (e. g., 8728-8736) are believed to tubes designed by Philips and registered by its U. S. subsidiary Amperex, but not necessarily made or sold in North America. Info on these later types by courtesy of Åke Holm.

5512 Xmtg. triode, glass ring-seal coaxial, fil. 6.3 V @ 435 A, 25 kW, 7.5 kV DC, 108 MHz (F) (9-20-49).

5566-78 Vacuum HV industrial rectifiers, all Machlett. Some are definitely dual numberings of ML-numbered items (ML-101, etc.); the rest probably are.

5566 [AKA ML-101]; fil. 22 V @ 52 A, 60 kV applied, 2.5 A.

5567-68 Fil. 10.0 V @ 11.5 A, 125 kV in, 25 mA.

5569-70 fil. 10.0 V @ 11.5 A, 140 kV in, 25 mA.

5571, 73 Fil. 13.0 V @ 12.4 A, 140 kV in , 50 mA.

5572 Fil. 10.0 V @ 17.8 A, 140 kV in, 50 mA.

5574 Fil. 13.0 V @ 12.4 A, 150 kV in, 50 mA.

5575 [AKA ML-100]; fil. 20 V @ 24 A, 150 kV PIV, 500 mA, 750 W diss., convection cooled (ML, W) (W rates at 320 mA) (3-10-48). Also see 5625.

5576 [AKA ML-200]; fil. 20 V @ 32 A, 150 kV PIV, 1.25 A, 1 kW diss., convection cooled (3-10-48).

5577-78 Fil. 13.0 V @ 12.4 A, 200 kV applied, 25 mA.

5674 Electrometer duotriode, tubular bulb w/ cap, 6-pin base, fil. 3.8 V @ 90 mA, 10 V max., for balanced bridge ckt., can measure 5 X 10^{-10} μA (GE) (11-15-47).

5882 Full-wave rectifier, octal, heater 12.6 V @ 600 mA, 350 V in, 55 mA <6S>.

5884 T3X4 submin. electrometer duotetrode, fil. 1.25 V @ 10 mA, g_m 0.015 mS (RA) (7-1-57) <5K>.

5960 [AKA S340, TD-1]; cold-cathode discharge tube (BX) (3-28-51).

5988-91 Ionization gauges (*HK*, LK) (*Electronics*, 10-50).

5988 [AKA VG-2]; plate on rod, fil. and grid wires out press; sensitivity 25 μA/micron.

5989 [AKA VG-24G]; HK-54 w/ usual base and grid-out-side; 5/16" tubulation out top; sensitivity 50 μA/micron.

5990 [AKA VG-54]; HK-54 w/ usual base and grid-out-side; 7/16" tubulation out top; sensitivity 200 μA/micron.

5991 [AKA VG-100]; all-glass type w/ all-tungsten elements (easy to outgas), horizontal cylindrical plate, 6 long base pins; sensitivity 75 μA/micron.

6102-03 Rectifiers, T-T fil. 5 V @ 7.2 A, 150 mA (W) (both 3-26-54).

6102 Cup-like glass body, 2-27/32" dia. by 2-3/16" long, large disc anode sealed into top, button fil. studs at bottom, oil-cooled, 40 kV PIV.

6103 Like 6102 but w/ 3 radiator discs added to anode for air cooling, derated to 20 kV.

6109 [AKA BS404]; apparently an adjustable corona voltage regulator, 3/8" dia. tubular metal body, glazed porcelain insulator, and electrode cap at the. Body has large setscrew to change voltage over the range 645-705 v; 55 μA max (VN).

6142 [AKA TD-9A]; gas diode voltage regulator (BX) (7-10-53).

6196 Electrometer tetrode, fil. 3.0 V @ 50 mA, 9 V (Mazda) (10-10-52). Also see 6250.

6250 Electrometer tetrode, fil. 2.5 V @ 45 mA, 9 V (Mazda) (10-10-52). Also see 6196.

6255 [AKA 56AVP]; photomultiplier.

6269 Rectifier and clipper diode, ext. anode, 2" long, flying leads for fil., heater 26.5 V @ 350 mA, 16 kV PIV, 250 mA peak (AX). Also see (UE) 588.

6356-59 Gas noise sources (BX) (all 10-9-53). All have noise ratios of 15.2 dB (*i. e.*, noise level above thermal noise), the standard value for argon fill. Also see 6684.

6356 [AKA TD10]; for 3.95-5.85 GHz in RF-49/U WG, or 5.85-6.20 GHz in RG-50/U; 70 V drop @ 250 mA.

6357 [AKA TD11]; for 8.2-12.4 GHz in RG-25/U WG, 75 V drop @ 200 mA.

6358 [AKA TD12]; for 2.60-3.95 GHz in RG-48/U WG, 80 V drop @ 250 mA.

6359 [AKA TD13]; for 18.0-26.5 GHz in RG-53/U WG, 65 V drop @ 200 mA.

6361 [AKA TT-25]; "single convectron" "misc. type" (BX) (9-4-53).

6369 ATR tube, 1B37A repackaged in half-height WG, 0.9" x 0.2" inside w/ "contact" nonpressurized flanges, for 8.5-9.0 GHz (BL, MA). Variants: 6393, 6396.

6395 Min. pentode, fil. 1.2 V @ 50 mA, gm 0.9 mS.

6436 [AKA CK1036]; T3 submin. cold-cathode rectifier, 1.5 kV PIV, 100 μA (RA) (9-12-55).

6440-41 Vacuum gauges, 10 V @ 100 mS (Adzam) (both 2-12-54).

6527 Magnetron, fixed at 9375 MHz, potted flying leads for heater, heater 7.0 V @ 600 ma, 6 kV @ 5.5 A, interchanges w/ 2J42, operable at high altitude (GE) (8-16-54).

6538-39 Trigger tubes (AX) (both 10-11-54).

6538 [AKA Z800U].

6539 [AKA Z801U].

6658 TWA, 1.7-4.0 GHz, metal shell, CO, both RF leads out one end, 10 W CW out (ITT).

6659 [AKA CK1042]; T3 submin. cold-cathode rectifier, 2.8 kV PIV, 1 mA (RA) (3-19-56).

6684 [AKA TD18]; gas noise source, 12.4-18.0 GHz in RG-91/U WG, 70 V drop @ 200 mA, 15.2 dB ("argon") noise ratio (BL) (6-13-55). Also see 6356-59.

6755 Thyratron, 4-pin base, fil. 2.5 V @ 11 A, 1.5 kV PIV, 3.2 A.

6782 [AKA TD-22]; gas noise source, 2.60-3.95 GHz, in RG-48/U WG, 45 V drop @ 250 mA, 15.2 dB ("argon") noise ratio, AC- or DC-operated (BX) (4-29-57).

6835 [AKA QK464]; storage tube, for scan conversion, etc; sotres picture or date frame, reads out 30,000 times; 600 line resolution (RA) (2-13-56).

6852 [AKA TD-24]; gas noise source, 3.3-4.9 GHz, in WR-229/U WG, 65 V drop @ 250 mA, 15.2 dB ("argon") noise ratio, AC- or DC-operated (BX).

6881 [AKA TD-21]; gas noise source, 1.12-1.70 GHz, in RG-69/U WG, 65 V drop @ 250 mA, 15.2 dB ("argon") noise ratio, DC-operated (BX) (10-28-57).

6882 [AKA TD-23]; gas noise source, 8.2-12.4 GHz in RG-52/U WG, 115 V drop @ 200 mA, DC-operated, 18.0 dB ("neon") noise ratio (BX) (7-3-61).

6912 Vidicon, 1-½" dia., for broadcast use (Resistron Labs) (9-17-56).

6932 T2X3 flat-press pentode, 6088 w/ separate suppressor lead (RA).

6964-64 Ignitron rectifiers, 16" (GE).

6964 With one grid.

6965 With two grids.

6965-66 Ignitron rectifiers, 20" (GE). 12 give 12 MW of DC @ 850 V.

6965 With one grid.

6966 With two grids.

7016 [AKA NL606]; gas-mercury rectifier, stepped tubular bulb on 4-pin base, fil. 2.5 V @ 17 A, 900 V PIV, 6.4 A (7-29-57).

7030 Rectifier/charging diode, 7" high, 3-17/32" dia., three posts out crown, fil. 13 V @ 36 A, 2.5 kV, PIV, 200 mA, 2.5 kW diss., forced-air cooled (F) (6-27-60).

7064 [AKA XP1000]; photomultiplier (DuM?) (8-5-57).

7065 [AKA 150AVP]; photomultiplier (DuM?) (8-5-57).

7100 Vacuum rectifier or clipper diode, 30 kV PIV, 3 A, 3.5 kW diss., forced-air cooled (IT) (5-21-62).

7101 [AKA TD-29]; gas noise source, 1.12-1.70 GHz, in RG-69/U WG, 65 V drop @ 250 mA, 18.0 dB ("neon") noise ratio, AC- or DC-operated (BX).

7131 Vacuum rectifier or clipper diode, 40 kV PIV, 3 A, 3 kW diss., forced-air cooled (IT).

7209 Xmtg. triode, 6442 format, high shock rating, 3 GHz, plate-pulsed at 3.5 kV @ 3.0 A (ML) (8-1-60).

7210 Xmtg. triode, 6442 format, 3 GHz, plate-pulsed at 3.5 kV @ 2.8 A, 12-sec. warmup (ML) (8-1-60).

7222 "Iatron" storage tube, 5", electrostatic focus and deflection, two writing guns (IT) (6-15-59).

7256 Magnetron, tunes 8.5-8.6 GHz, 40 kW pulse output (7-7-58).

7258 Triode-pentode, mobile-rated variant of 6AN8, heater 13.5 V @ 210 mA (GE, RCA, SY, TS) (7-14-58) <9DA>.

7322, 7620, 7621 Cermet ruggedized hydrogen thyratrons, cylindrical ring-seal bodies, anode on pin recessed into top, grid on ring, cathode on mounting flange, heater studs at base, w/ H_2 reservoir (EG&G).

7322 [AKA 1802]; 5-¼" high, 3-5/8" dia., heater 6.3 V @ 16 A, 25 kV PIV, 1.5 kA peak, 2 A, 10 min. warmup (1-19-59). H_2 reservoir takes 6.3 V @ 6 A. Functional replacement for 5948, 5949 and (often) 1257 (EG&G).

7620 [AKA HY-2]; 4-3/8" high, 2-5/16" dia., heater 5.0 V @ 7.5 A, 20 kV PIV, 500 A peak, 0.4 mA avg., 5 min. warmup. Functional replacement for 1258, 3C45, and (often) 4C35 (EG&G). H_2 reservoir takes 6.3 V @ 4 A.

7621 [AKA KU-70C, HY-2]; 2-½" high, 1.2" dia., heater 6.3 V @ 3.5 A, 8 kV, 100 A peak, 100 mA avg., 350 kW pulse output, 30-sec. warmup, functionally replaces 1258, 3C45, and 4C35 (EG&G, KL) (5-21-62). H_2 reservoir wired across heater.

7338 TWA, 2.4-3.6 GHz, metal case, both RF leads out one end, 1 kW pulse output (IT).

7339-40 TWAs, 8.0-9.6 GHz, metal case, both RF leads out one end, 1 kW CW output (IT).

7341 TWA, 8.0-9.6 GHz, 5 W CW output.

7347 TWA, 2.0-4.0 GHz, 1 kW output.

7350 TWA, 7.0-11.0 GHz, 1 kW output.

7386 Hydrogen thyratron, same ratings as 5545 (5-18-59).

7407 TWA, 6.7-11.4 GHz, 150 mW output.

7414 Magnetron, tunes 5.4-5.9 GHz, 10 kW pulse output (3-23-59).

7443 Magnetron, 5.5-5.6 GHz, 400 W output.

7444 Magnetron, tunes 5.4-5.9 GHz, 1 kW pulse output (5-15-61).

7445 Magnetron, 9.1-9.5 GHz, 100 W output.

7475 [AKA LS620]; neon voltage regulator, on Br. B4 4-pin base, 100 V @ 8 mA (MU, PH).

7484, A Magnetron, tunes 1250-1350 MHz, 2 MW output (11-23-59).

7539 [AKA 1855]; Graphechon scan-converter tube (RCA) (4-11-60).

7585 Ignitron, Size C, 5552A char., cooled by spiral water coil around arc chamber; interchanges w/ other Size C tubes (AX) (1960).

7620 See 7322.

7621 See 7322.

7632 [AKA ORP10]; photoconductor (12-28-59).

7633 [AKA ORP11]; photoconductor (12-28-59).

7665-67 Cermet hydrogen thyratrons (KL).

7665 [AKA KU-72]; 20 kV peak @ 350 A, 3.5 MW output, 300 mA avg.

7666 [AKA KU-73]; 25 kV peak @ 1 kA, 12.5 MW output, 1.5 A avg.

7667 [AKA KU-74]; fil. 6.3 V @ 22.0 A (KL), 33 kV peak @ 2 kA, 33 MW output, 4 A avg. (11-26-62).

7779 [AKA XD56]; vac. rectifier or clipper diode, 25 kV PIV, 6 A, 3 kW diss., forced-air cooled (IT) (11-28-60).

7782 [AKA KU-71]; hydrogen thyratron, 10 kV peak @ 200 A, 1 MW output, 200 mA avg. (KL) (11-26-62).

7810-12 TWAs, for 4-GHz TV radio-relay use, heaters 6.3 V (TSU) (1954). Possibly used only in Japan.

7810 Low-noise rcvg. preamp.

7811 Driver stage, 1.5 kV, 23 dB gain, 350 mW out.

7812 Output stage, 2.3 kV, 13 dB gain, 3.8 W out.

7817 [AKA XP1000]; photomultiplier (9-19-60).

7818 [AKA XP1030]; photomultiplier (10-24-60).

7820 Xmtg. triode, μ 6, 8 kV, Forced-air cooled, 4.3 kW (F) (12-12-60).

7831-32 Xmtg. cermet triodes, μ 18, 10 kV, 50 MHz (F).

7831 Water-cooled, 20 kW (2-18-63).

7832 Vapor-cooled, 30 kW (11-25-63).

7836 [AKA QE08/200H]; xmtg. triode.

7837-39 Xmtg. triodes, μ 41, 22 MHz (F) (all 9-25-61).

7037 Water-cooled, 90 kW, 17.5 kV.

7038 Forced-air-cooled, 25 kW, 25 kV.

7039 Forced-air-cooled, pulse-rated at 160 A peak, derated to 10 kW, 65 kV.

7866 [AKA KU-274]; cermet hydrogen thyratron, 50 kV peak @ 2 kA, 4 A avg., 50 MW out (KL)(12-10-62).

7869 Vacuum rectifier or clipper diode, 56 kV PIV, 4 A, 3.5 kW diss., forced-air cooled (IT) (7-3-61).

7884 [AKA YL1060]; xmtg. tetrode (AX?)

7906-07 Vacuum rectifiers or clipper diodes, 50 kV PIV, 15 A (IT) (both 2-26-62).

7906 Water-cooled, 50 kW diss.

7907 Forced-air cooled, 20 kW diss.

7971 Power pentode, ruggedized Ediswan 11E12, octal base, heater 6.3 V @ 1.6 A, gm 13 mS, 800 V, 200 mA, 20 W (2-13-61).

8045-46 Xmtg. triodes, μ 20, 16 kV, 22 MHz (F) (11-25-63).

8045 Water-cooled.

8046 Forced-air cooled.

8104, J Xmtg. triodes, μ 25, 8 kW, 6 kV, 30 MHz, water-cooled (F) (2-26-62).

8109-10 Vacuum rectifiers or clipper diodes, 60 kV PIV, 12 A (IT) (both 12-3-62).

8109 Water-cooled, 20 kW diss.

8110 Forced-air cooled, 10 kW diss.

8131-33 Xmtg. cermet triodes, μ 20, 6.5 kV, 80 MHz (F).

8131 Water-cooled.

8132 Forced-air cooled.

8133 Vapor-cooled.

8136 Min 9-pin sharp-cutoff pentode, computer-rated 6DK6 (AX, GE, RCA) (1-1-62) <7CM>. Replaced 6DK6 in vertical amps of later Tektronix 540/550-series scopes.

8146-47 Xmtg. cernet triodes, μ 17, 10 kV, 50 MHz (F) (both 4-6-64).

8146 Water-cooled, 40 kW.

8147 Air-cooled, 20 kW.

8148 Xmtg. triode, water-cooled, μ 5.5, 8 kV, 40 kW (F) (12-17-62).

8253 Hydrogen thyratron, sim. to 5C22 or 6279.

8366 Magnetron, fixed at 33.2 GHz ± 0.2 GHz, 7619 ratings - probably a retuned 7619 (SY).

8544 [AKA LCF80]; premium 6LN8.

8581 [AKA YL1270]; xmtg. tetrode.

8598 Image converter, 12 kV (TF).

8679 [AKA YL1121]; xmtg. tetrode (AX).

8680 [AKA YD1212]; xmtg. triode (AX).
8681 [AKA YJ1080]; pulse magnetron.
8728-36 Xmtg. triodes (8-8-66 for 8732-36; unknown for others).
8728 [AKA YD1150]; (PH).
8729 [AKA YD1151].
8730 [AKA YD1152].
8731 [AKA YD1160]; (AX).
8732 [AKA YD1161].
8733 [AKA YD1162].
8734 [AKA YD1173].
8735 [AKA YD1182].
8736 [AKA YD1192].
8801 [AKA YD1180]; xmtg. triode.
8812-14 Xmtg. tetrodes (AX?).
8812 [AKA YL1420].
8814 [AKA YL1440].
8813 [AKA YL1430].
8867 [AKA YD1352S]; xmtg. triode (AX).
8888 [AKA YL1470]; xmtg. tetrode.
8901 [AKA VA-98M]; reflex klystron, tunes 23.6-24.4 GHz, 2.8" long by 1" high by 1.3" deep, flying leads, 500 V, 100 mW out (VA).
8913 [AKA YD1195]; xmtg. triode.
8915 [AKA YL1520]; xmtg. tetrode.
8918 [AKA YD1342]; xmtg. triode.
8935-37 Xmtg. triodes (AX?).
8935 [AKA YD1185].
8937 [AKA YD1197].
8936 [AKA YD1187].
8952 [AKA YD1175]; xmtg. triode, fil. 5.6 V @ 130 A, 10 kW.
8958 [AKA YD1177]; xmtg. triode.
8990 Xmtg. *tetrode*.

NONREGISTERED TYPES (P. 105 ff.)

1 Mercury half-wave rectifier, ST14 bulb (RCA, by courtesy of Bob Dennison); probably a predecessor to the (vacuum) 1-V.
2B-H5 Nuvistor triode, heater 1.8 V @ 600 mA (HI).
3D-HH13 Nuvistor-style duotriode; has regular nuvistor base; envelope about 2-½ times usual height; heater 3.5 V @ 600 mA, μ 36, g_m 13 mS (TSU) <8LK>. Pictured in Hisashi Ohtsuka, The Classic Valves, 1994, p. 241. May have been US-registered as (GE, SY) 3FX7.
6D-HH13 Nuvistor-style duotriode; variant of 3D-HH13 w/ heater 6.3 V @ 300 mA. May have been US-registered as (GE, SY) 6FX7.
45 ("More Lore.") An Internet posting has referenced an ST16-bulbed tube stamped "45" and branded "Radiocoin," comprising a tetrode internally connected as a triode, and testing OK as a 45.
545, 552, 554, 588, 589 Vacuum HV diodes, rectifiers or radar clippers, ext.-anode, minimal glass bodies, flying fil. leads w/ lugs, for air or oil cooling (UE), 1956.
545 Length 2", 7/8" dia., 50 mA.
552 Length w/o leads 1-3/8", dia. 7/8" overall, anode dia. 0.55", T-T fil. 2.5 V @ 1,7 A, 20 kV PIV in air or oil, 10 mA; fits 60-A fuse clip.
554 Length w/o leads 2-¼", dia. 1.2" overall, anode dia. 0.69", heater 6.3 V @ 3.5 A, 17 kV PIV, 70 mA in air or 150 mA in oil.
588 Heater 6.3 V @ 1.65 A, 16 kv PIV, 65 mA. Also see 6269.
589 Length w/o leads 1.9, dia. 7/8" overall, anode dia. 0.6", heater 6.3 V @ 1.6 A, ratings in air 10 kV PIV @ 10 mA or 16 kV PIV @ 45 mA; ratings in oil 100 or 65 mA respectively; fits 60-A fuse clip. Possibly same as (TS) 6339.
572-3, -10, -30, -160 Audio power triodes, tubular hard-glass bulbs on ceramic UX bases, graphite anodes, T-T fils., 125 W (SV). Mu corresponds to the dash-number. These are in addition to the existing 572B.
M2057 Compactron beam power tube similar to oversized 8950, for use in RF linear amps (GE).
T-10-S Transmitting variant of 10 w/ plate cap. Also see T-30-S.
T-30-S Variant of 30 w/ cap added for plate, for use in regenerative SW receivers (Triad; described in *Radio*, June 1933, by courtesy of Bob Thomas). A plate-capped *receiving* tube!

MORE BENDIX - RED BANK TYPES (p. 120)

TD-1 [AKA 5960, q. v.]; cold-cathode discharge tube.
TD-9A [AKA 6142, q. v.]; gas diode voltage regulator.
TD-10 [AKA 6356, q. v.]; gas noise source.
TD-11 [AKA 6357, q. v.]; gas noise source.
TD-12 [AKA 6358, q. v.]; gas noise source.
TD-13 [AKA 6359, q. v.]; gas noise source.
TD-17 [AKA 5643]; q. v.]; submin. thyratron.
TD-18 [AKA 6684, q. v.]; gas noise source.
TD-19 Gas diode voltage regulator.
TD-21 [AKA 6881, q. v.]; gas noise source.
TD-22 [AKA 6782, q. v.]; gas noise source.
TD-23 [AKA 6882, q. v.]; gas noise source.
TD-24 [AKA 6852, q. v.]; gas noise source.
TD-28 Cold-cathode tetrode thyratron.
TD-29 [AKA 7101, q. v.]; gas noise source.
TD-36 [AKA 7416, q. v.]; gas diode.
TD-45 Cold-cathode discharge tube.
TD-61 [AKA 5787WA, q. v.]; voltage regulator.
TD-68 [AKA 6542, q. v.]; voltage regulator.
TE-40 [AKA 6888, q. v.]; dual-control pentode.
TE-56 [AKA 3D21B, q. v.]; pulse modulator
TE-74 [AKA 3D21, q. v.]; pulse modulator.
TE-81 [AKA 7757, q. v.]; HV amplifier.
TE-90 [AKA 5R4WGB, q. v.]; rectifier.
TE-93 [AKA 5R4WGA, q. v.]; rectifier.
TG-25 to **TG-60** Two-electrode glass vacuum spark gaps, for protective use, tubular w/ end caps, radioactive-stabilized.
TG-25 Fires at 400 V, 3W
TG-26 Fires at 750 V, 5 W, 1 kA surge.
TG-27 Fires at 1.0 kV, 5 W, 1 kA surge.
TG-30 Fires at 2.0 kV, 5 W, 2 kA surge.
TG-34 Fires at 5.0 kV, 5 W, 3 kA surge.
TG-37 Fires at 10.0 kV, 5 W, 4 kA surge.
TG-56 Fires at 20.0 kV, 7.5 W, 5 kA surge.
TG-60 Fires at 50 kV, 7.5 W, 6 kA surge.
TN-1 Min. noise generator, 8.5-9.6 GHz, noise source in mount, WG, transmission type.
TN-2 Min. noise generator, 8.5-9.6 GHz, noise source in mount, WG, terminated type.
TN-3 Min. noise generator, 2.7-2.9 GHz, noise source in mount, WG, terminated type.
TT-1 [AKA 6144, q. v.]; noise diode.
TT-2 [AKA 5947, q. v.]; temperature-limited diode.
TT-29 [AKA 6352, q. v.]; temperature-limited diode.
TT-30 [AKA 5845, q. v.]; temperature-limited diode.
TT-65 [AKA 5783WA, q. v.]; voltage regulator.

HEINTZ & KAUFMAN (P. 122)

VG-2 [AKA 5988, q. v.]; ionization gauge.
VG-24G [AKA 5989, q. v.]; ionization gauge.
VG-54 [AKA 5990, q. v.]; ionization gauge.
VG-100 [AKA 5991, q. v.]; ionization gauge.

KUTHE LABORATORIES TYPES (P. 123)

Later, ITT. Note that W also used numbers prefixed with "KU."

KU-14 [AKA 6777, q. v.]; hydrogen thyratron.
KU-25 Hydrogen thyratron, 5C22 (q. v.) adapted for high pulse rate.
KU-274 [AKA 7866, q. v.]; hydrogen thyratron.
KU-51 Hydrogen diode, rectifier or radar clipper diode, fil. 5.0 V @ 6.2 A, 10 kV PIV, 200 mA as rectifier.
KU-52 [AKA 8264, q. v.]; hydrogen diode.
KU-53 [AKA 7178, q. v.]; hydrogen diode.
KU-70C [AKA 7621, q. v.]; hydrogen thyratron.
KU-71 [AKA 7782, q. v.]; hydrogen thyratron.
KU-71Z [AKA 8765, q. v.]; hydrogen thyratron.
KU-72 [AKA 7665, q. v.]; hydrogen thyratron.
KU-72Z [AKA 8553, q. v.]; probably hydrogen thyratron.
KU-73 [AKA 7666, q. v.]; hydrogen thyratron.
KU-74 [AKA 7667, q. v.]; hydrogen thyratron.
KU-82 [AKA 7583, q. v.]; hydrogen thyratron.
KU-92 Cermet hydrogen diode, rectifier or radar clipper, 15 kV PIV, 500 mA as rectifier.
KU-93 [AKA 8275, q. v.]; hydrogen diode.
KU-94 Cermet hydrogen diode, rectifier or radar clipper, 20 kV PIV, 4.0 A as rectifier.
KU-99 Hydrogen thyratron, fil. 6.3 V @ 2.7 A.

SVETLANA (New section, ca. P. 152)

The SV product line, besides the 572-family (above), includes the following smaller tubes:

5U4G	811-3 and -10
6550C	833A, C
6AS7G	8560AS
6BM8	EF86/6267
811A	EL34/6CA7

There are a wide variety of larger tubes: some of "Eimac" types, some of SV's own design like the 4CX1600B and -U. There are reports of plans to introduce more "audio" types.

WESTERN ELECTRIC (P. 155 ff.)

P. 156. Frank Hagenbuch reports having a 205F stamped "FAST" (quick-heating?). This may be related to the "205FA" reported in 75 Years of WEstern Electric Tube Manufacturing. Further info welcome.

P. 160. The 310A is normally an audio type or as a repeater tube used in telephone offices. However, it became a submarine (!) repeater tube as well (*Electronics*, Jan. 1952, p. 165). In 1952 the Western Union Telegraph Company used 16 310As in a submerged telegraph repeater, 100 miles off Long Island, in its cable from Rockaway Beach, LI, to Bay Roberts, Newfoundland. The tubes were used in two push-pull amplifiers: one working, one spare. Speed of the cable, originally 83 words per minute, was tripled.

P. 165. The 715-types were not exclusively radar pulsers. Two 715Bs were used as current regulators in the shore-end power supply for AT&T's Key West - Havana submarine cable, 1950. The transmitter in the National Bureau of Standards C2 ionospheric sounder, ca. 1951, used six 715Cs, in two driver-driver-final strings; later replaced with 4PR60s.

P. 167. The D-171225 was a copy of the Siemens C3E repeater tube. Not widely known is the fact that Sylvania also made 1000 reverse-engineered copies of this captured type, on the same "crash" basis [5].

SUBSTITUTIONS (P. 173, COL. 1)

Special hints [6] for late-vintage Zenith tube Trans-Oceanics are as follows. The "unobtainable" 1L6 can be replaced by the common 1R5 by clipping off Pin 5, which is an extra connection to the filament. The cost of this substitution is that correct alignment and dial calibration are unobtainable on the top short-wave bands even though the radio may perform well. This has also been reported [7] as working well in a Zenith 5G41 AM-only portable.

The similarly scarce 50A1 ballast in late T-Os is replaceable with a 1000-ohm 3-watt resistor. To get the voltage regulation that the 50A1 provided, a 9.1-volt zener diode (1N4739, etc.) is connected across the filament string (cathode on Pin 7 of the 3V4, anode on Pin 1 of the 1U5).

AUCTION PRICES (P. 182 ff.)

Some prices from the 1996 Rochester auction are:

BY BRAND NAME

Amrad "S", S16 style, w/ ceramic socket 25
Cunningham Audiotron, good 95
Cunningham Audiotron, good, in UX adapter 90
De Forest
- D-01A w/ can, good 80
- DV-2 w/ can, good 70
- DV-3 (2), fils. OK 40
- H, glass chips inside, unknown cond. 270
- Spherical audion, 1 fil. good 1100

Electrad diode w/ socket 35
Marathon AC-608 (5), all good 130
Marconi - De F audion, BBT, open 38
Myers RAC (2) ..... good w/ socket, 70; open, 43
Northern Electric
- 216A, good 45
- 221D (3), good 48
- DX-221, good 35
- RX-235 (pair), good 10

QRS Red-Top, NIB, w/ paper 50
RCA
- 2A3 (5), NIB 260
- 203As (2), aluminum base, crisp "world" boxes 30
- 1608 (3), NIB 80
- 1848 (?) iconoscope, 5", octal base 240
- 1850A iconoscope, w/ GE box 210
- UV-201A, BBT, pretty "rainbow" getter, good emission 40
- WD-11, BB, NIB 80
- Store-display neon, cond. unk 105

Speed (Cable) 296 "Triple Twin," good 50
Westinghouse
- WL-195, good 10
- WL-706 magnetron 30
- WR-21 in box, good 190

Western Electric
- 1A photocell in orig. can 110
- 2A photocell, one lead off 48
- 201A (*not* "industry" 201A!), good 180
- 205B, 205D, and 205E, good fils. 110
- 205D (2), good 260
- 216A (3), two OK 125
- 216A, good (3 lots of 1) 60, 60, 60
- 216As (3), good 140
- 216As (5), good 160
- 720CY magnetron, NIB 43
- 2J50 magnetron, NIB 50
- VT-1, NIB, less tips 60

GENERAL

UV-207, open 45
WD-11s (2), tipped, bklt. bases, good 70
Crookes "mineral" CRT, repro, vertical on wood base 225
Crookes Maltese-Cross CRT, works 300
Disc-TV neon (De Forest 601?), dud 75

FOREIGN

CV1226 short silica valve (Br.) and French TM-30, good 170
Early Br. radar (20): CV85, CV92, CV90, CV116, CV1484, etc.;

plus some US.....160
E4M Métal (French WW I), used.....850
Genelex KT-66 (4), good, in orig. boxes.....210
Genelex KT-88 (2), used, "excellent".....110
Marconi-Osram V24, good.....100

SWEEP TUBES (P. 178 ff.)

Here is some information on the use of sweep tubes in CB linear amplifiers [8].

The Kris "Big Boomer" uses a 6KV6, driving two or (depending on model) three 6LQ6s. Three 6KV6s are in the Varmint "10 meter" amplifier, drivieng six 6LR6s.

The DNA Phantom 500 uses four 6JG6s dribving six 6LQ6s; the PD400 uses one 6JG6 driving another, driving six 6LQ6s; the Maverick uses four 6JB6s driving four 6LQ6s.

The MACO Majestic amplifier uses the (GE) M2057 Compactron.

REFERENCES

1. By courtesy of Alan Douglas and Jim Cross.
2. By courtesy of Jim Cross.
3. P. Guibord and J. Stephen, "Those Unique Rogers Tubes," Ottawa Vintage Radio Club newsletter, Vol. 4 No. 2 (Summer 1996), pp. 3-7.
4. H. F. Dart and G. C. Crom, Frequency Amplification (Scranton, PA: International Textbook Co., 1930), pp. 54-55 and 60-61 (by courtesy of Jim Cross).
5. L. A. Sibley, "'German' Tubes by Western Electric," *Radio Age*, March 1997, pp. 12-13.
6. L. A. Sibley, "Restoring the Later Trans-Oceanics," *Radio Age*, Vol. 20 No. 5 (May 1995), p. 10.
7. M. R. George, "A Tube Substitute for the Type 1L6," *Antique Radio Classified*, Vol. 14 No. 1 (Jan. 1997), pp. 12-13.
8. By courtesy of Jon Cohen.

TRENDS IN TUBE DESIGN (PP. 3-4)

Additional insight may come from the chart on the next page, which is reproduced from an RCA sales reference of July, 1935. It lists receiving tubes *not* sold by RCA, giving a glimpse at the rest of the industry. The "groups" of competitors mentioned in the table were as follows:

	GROUP																		
Maker	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Arcturus		•				•													
Champion										•	•	•						•	
Gold Seal						•		•	•	•	•	•	•	•			•	•	
Grigsby-Grunow							•	•		•									•
Hy-Sylvania			•		•	•	•	•	•	•	•	•						•	
Hytron					•	•		•				•					•		
Johnsonburg		•			•	•				•	•	•			•	•		•	
Ken-Rad				•	•			•	•	•									
Nat'l Union	•							•				•				•	•		
Raytheon	•			•	•			•	•	•									
Republic												•	•	•	•	•	•	•	•
Sparton							•						•		•		•	•	
Triad								•											
Tung-Sol						•			•	•		•					•	•	

These are reference lists to give brief descriptions of available tubes and should not be used to establish their commercial status.

COMPETITORS RECEIVING TUBES

RECEIVING TUBES

NOT Manufactured or Merchandized By RCA Radiotron Division
(See Foot Note)

Tube Type	§ Mfgr's	Bulb Size	Base		Tube Description	Voltage
2A3H	Group 1	16	Med.	4-Pin	Power Amplifier Triode	2.5 H.
2B6	" 2	16	Med.	7-Pin	Triple Twin Power Output	2.5 H.
2F7	Ken Rad	ST12	-	7-Pin	Triode Pentode Converter	2.5 H.
6B5	Raytheon	12	Med.	(?)	Triple Twin Power Output	6.3 H.
6B6	Group 2	ST16	Med.	7-Pin	Triple Twin Power Amplifier	6.3 H.
6C7	Grig. G.	12	Small		Duplex Diode Triode (Spray Shield)	6.3 H.
6D7	Grig. G.	12	Small	7-Pin	R-F Amplifier (Spray Shield)	6.3 H.
6E6	Nat. Un.	ST14	Med.	7-Pin	Twin Triode Power Amplifier	6.3 H.
6E7	Group 19	12	Small	7-Pin	Super-Cont. R-F Ampl. (Spray Shield)	6.3 H.
6Y5S	Grig. G.	12	Small	6-Pin	Full-Wave Mercury Vapor Rectifier	6.3 H.
6Z5	Grig. G.	12	Small	6-Pin	Full-Wave Rectifier	6.3/12.6 H.
12A5	Group 5	12	Small	7-Pin	Pentode Power Amplifier	6.3/12.6 H.
**12Z5	" 6	ST12	Small	7-Pin	Full-Wave Rect. & Voltage Doubler	6.3/12.6 H.
2	Grig. G.	14	Med	5-Pin	Duplex Diode Detec. (No Spray Shield)	2.5 H.
2S	Grig. G.	14	Med.	5-Pin	Duplex Diode Detec. (Spray Shield)	2.5 H.
4	Grig. G.	12	Med	5-Pin	Duplex Diode Detec. (No Spray Shield)	2.5 H.
4S	Grig. G.	12	Med.	5-Pin	Duplex Diode Detec. (Spray Shield)	2.5 H.
10S	Triad	S17	Med.	4-Pin	Osc. or Amp.. (Plate lead-top cap)	7.5 F.
14	Group 3	S14	Med.	5-Pin	Amplifier	14.0 H.
15	" 3	S12	Small	5-Pin	Detector Oscillator (R. F. Pentode)	2.0 H.
17	" 3	S14	Medl	5-Pin	Amplifier	14.0 H.
18	" 3	S17	Med.	6-pin	Pentode Power Amplifier	14.0 H.
29	Hyg. Syl.	S12	Small	6-Pin	Detector	2.5 H.
51	Group 8	S14	Med.	5-Pin	Super-cont. R-F Amp. (= our 35)	2.5 H.
52	" 9	S14	Med.	5-Pin	Power Ampl. - Double Grid Triode	6.3 F.
64	Nat. Un.	12	Small	5-Pin	Detector and Amplifier	6.3 H.
65	Nat. Un.	12	Small	5-Pin	A. F. Amplifier	6.3 H.
67	Nat. Un.	12	Small	5-pin	Detector & Amplifier	6.3 H.
68		12	Small	5-Pin	Power Output Pentode	6.3 H.
69	Hyg. Syl.	S12	Small	6-Pin	Special Detector	6.3 H.
70	Sparton	S12	Small	6-Pin	Duplex Diode-Detector-Double Grid	6.3 H.
84	Grig. G.	12	Small	4-Pin	Half-Wave Rectifier	2.5 F.
90	Ken-Rad	S12	Small	6-Pin	Double Grid Detector (A-C)	2.5 H.
92	Ken-Rad	S12	Small	6-Pin	Double Grid Detector (D-C)	6.3 H.
96	Ken-Rad	S12	Med.	4-Pin	Half-Wave Mercury Vapor Rectifier	10.0 H.
181	Sparton	17	Med.	4-Pin	Power Amplfier	3.0 F
182B	Group 11	S17	Med.	4-Pin	Detector Amplifier	5.0 F.
183	" 3	S17	Med.	4-Pin	Power Amplifier	5.0 F
281M	Hytron	S19	Med.	4-Pin	Half-Wave mercury Vapor Rectifier	7.5 F.
401	Group 13	14	Med.	4-Pin	*Ampl. & Detec.-(Unimport.)	3.0 H.
403	" 14	T14	Med.	4-Pin	*Power Amplifier (")	3.0 H.
482A	Sparton	17	Med.	4-Pin	D-C Power Amplifier	5.0 F.
482B	Group 15	17	Med.	4-Pin	Power Amplifier	5.0 F.
483	" 16	17	Med.	4-Pin	Triode Power Amplifier	5.0 F.
484	" 17	14	Med.	5-pin	D-C Detector Ampl. (Unimport.)	3.0 H.
484A	Sparton	14	Med.	5-Pin	D-C Amplifier Detector	3.0 H.
485	Group 18	S14	Med.	5-Pin	Detector Amplifier	3.0 H.
486	Sparton	14	Med.	5-pin	D-C R-F Amplifier (Unimportant)	3.0 H.
950	Nat. Un.	ST14	Med.	5-Pin	Power Amplifier Pentode (.120 Amp.)	2.0 F.
951	Nat. Un.	ST12	Small	4-Pin	Screen Grid R-F Amplifier	2.0 F.
985	John'b'g	14	Med.	4-Pin	Full-Wave Merc. Vap. Rect.(Unimport.)	5.0 F.
986	John'b'g	-	Med.	4-Pin	Full-Wave Merc. Vap. Rect. (")	5.0 F.
BA	Raytheon	19	Med.	4-Pin	Full-Wave Gaseous Rect. (Unimport.)	-
BH	Raytheon	14	Med.	4-Pin	Full-Wave Gaseous Rect.	-
BR	Raytheon	12	Med.	4-Pin	Half-Wave Gaseous Rect.	-
GA	Arcturus	14	Med.	5-Pin	Power Pentode	5.0 F.
Wun.	Arcturus	12	Small	6-Pin	Detector Twin Grid	2.5 H.
Wun. B	Arcturus	12	Small	6-Pin	Detector Twin Grid	2.5 H.
Wun. A-Auto	Arcturus	12	Small	6-Pin	Detector Twin Grid	6.3 H.
FW4	Fada		-		Flashograph tube with d. a. r. c. feature	-
F257	Fada		-		Pentode (unimportant)	6.3 F.

*Top Base
**RCA License Bureau states that this tube has been cancelled.
§Two or more companies manufacturing the same type tube are listed under group numbers 1, 2, 3, etc. in the accompanying chart.

Abbreviations:
F. - Filament Type
H. - Heater Type
Wun. - Wunderlich